Installation and Operation Manual
ProSeries Model SPS390
Dynamic Signal Analyzer
Part Two

Legacy Manual

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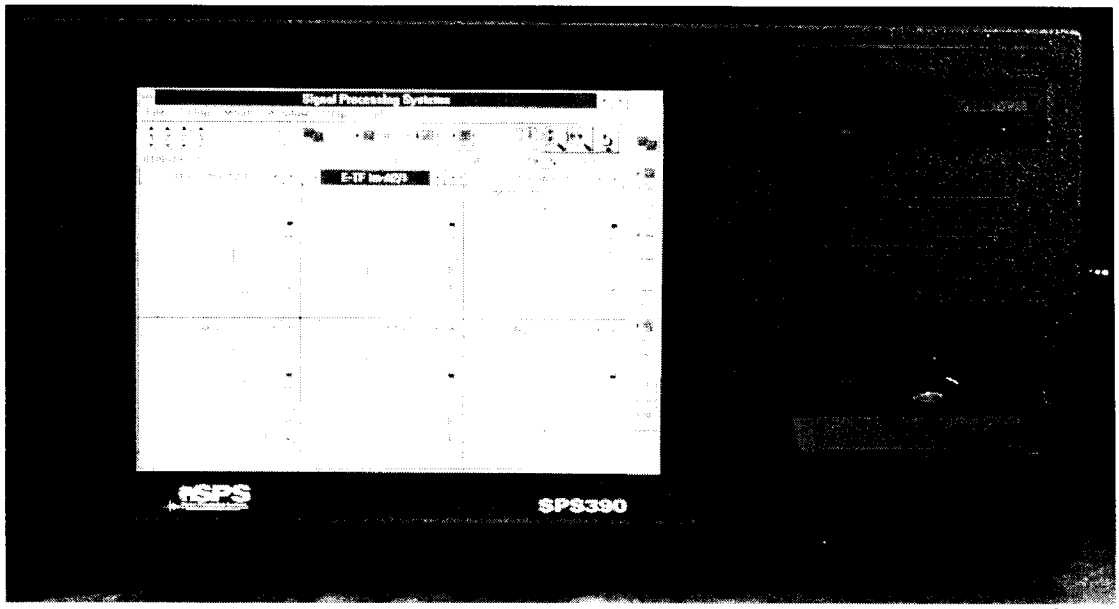
1-1 INTRODUCTION



The SPS390 is a versatile and easily configurable two-to-eight channel, 100-kHz analyzer that allows Live acquisition, analysis, and display of waveform signals, and post-processing (playback) of acquired data. The SPS390 is a completely self-contained system capable of various types of analyses for applications in mechanical vibration, acoustics, structural (modal), rotating machinery, and general test and measurement. You can choose from many options and operating modes to suit your particular requirements.

In addition to the standard features included with your instrument, additional options are available and may be installed in your particular configuration. These features are:

- Signature Ratio Analysis (SRA)
- Signal Source Generation (SSG)
- SMS Modal Analysis Interface
- Multiple Input Multiple Output (MIMO) Analysis

If these features are not installed, they will appear as *inactive* selections on the menus or with the dialogs.

All features of the SPS390 are accessed from pull down Menus. Parameters are selected via dialog boxes, and functions are selected by software control buttons.

All choices and parameter entries can be made solely with the trackball and trackball selector button, or you can use an optional mouse and keyboard. Where alphanumeric entry is required within the SPS390 application, a Virtual Keyboard is available that only uses the Trackball and Selector button.

Integral with the SPS390 are the Microsoft® Windows™ and DOS operating systems. The SPS390 takes full advantage of the Windows feature of running multiple

Windows programs simultaneously, some in the background and some in the foreground. The SPS390 can be treated just like any other Windows program in a foreground/background mode. Since the SPS390 has its own dedicated Digital Signal Processing (DSP) hardware, it is always collecting and processing data at an optimum rate even when the data is not being displayed in the foreground.

This manual concentrates on the features and operating modes of the SPS390. Information on Windows and DOS can be found in other manuals supplied with this system.

Color or shades of gray (red) schemes for the SPS390 use the setting created by the Windows control panel. These colors can affect the visibility of options and controls. The default SPS390 color selection is optimized for the particular display in the unit, either active matrix color or gas plasma display. Alternate color settings can be created by using the color settings in the Windows control panel.

1-2 ABOUT THIS MANUAL

This manual provides detailed information about using the SPS390. It is organized as follows:

Section 1, General Description and Safety Precautions gives an overview of the SPS390, covering major features, how to get started and lists important safety precautions..

Section 2, Installation instructs the user on inspecting the unit

Section 3, Operation describes how to use the SPS390. A quick start procedure and details for turning the equipment on; descriptions of controls, indicators, menus, dialogs, display windows, function key, and screen control areas.

Section 4, Theory of Operation describes the technical details of how the SPS390 works.

Section 5, Maintenance and Service describes routine maintenance which the user can perform including cleaning and step by step procedures for field calibration of the SPS390.

Section 6, External Interface Guide contain descriptions of the SPS390 data file types, formats and the configuration parameters that determine the data characteristics.

The **Glossary** provides definitions of many commonly used terms relating to acquisition of digital data and the dynamic properties of mechanical systems. If any term used in this manual is unfamiliar to you, you may find an explanation here.

1–3 GENERAL CONVENTIONS

The following types of formatting in the text identify special information:

☞ *This icon points out a crucial piece of information that should be noted before using the feature described.*

This icon identifies additional useful information regarding the feature discussed.

➲ *SPS390 HINT:* *This type of box appears throughout the text; it contains helpful tips and hints for effective software usage.*

Menu and dialog box callouts are listed in **bold** throughout the manual as they appear on panels or on the screen.

1–4 SAFETY SUMMARY

1–4.1 General

The following are general safety precautions that are not related to any specific procedures and therefore do not appear elsewhere in this manual. It is the user's responsibility to understand and apply these safety precautions during all phases of operation, service, and repair of this system. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of this system.

1–4.2 Grounding The System

To minimize shock hazard, system chassis and equipment cabinet must be connected to an electrical protective earth ground. The SPS390 is equipped with a three-conductor AC power cable. This power cable must be installed in accordance with installation procedures provided.

1–4.3 Safety Precautions

The SPS390 presents no hazard to operating personnel if operated in accordance with the instructions contained in this manual.

The protection provided by this equipment may be impaired if the equipment is not used in the manner specified by the manufacturer.

There are no user serviceable items inside the SPS390. Return the unit to the factory for servicing is necessary.

Do not set containers with liquids on top of the unit. Accidental spills can enter unit through cooling vents, cracks or media access slots.

When connecting unit to external electrical peripherals, ensure the SPS390 is switched off and the connector ratings specified in this manual are not exceeded.

1–4.3.1 Explosion Hazards

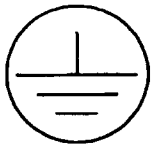
Do not operate the SPS390 in any area where flammable vapors are present. Operating any electrical device in such an environment may cause an explosion.

1–4.3.2 Electrical Shock Hazard

The three-conductor alternating current power line cord provided with the SPS390 grounds the front panel and frame to prevent electrical shock and injury to operating personnel. The national and local electrical codes require three connector ac outlets that connect the third wire of the line cord to earth ground. If the ac outlets where the SPS390 is to be operated are two-wire type outlets, it will be necessary to:

- Install a three-wire to two-wire adapter at the ac outlet.
- Connect the adapter ground lead to ground before connecting the power cord to the outlet.
- Test for ground continuity between the equipment chassis and any adjacent equipment or metal plumbing.

The following IEC symbols are used in the SPS390

Symbol	Definition
 IEC417, SYMBOL 5019	**PROTECTIVE GROUNDING Terminal: A terminal which must be connected to earth ground prior to making any other connections to the equipment.**
 IEC417, SYMBOL 5032	**A terminal to which or from which an alternating (sinewave) current or voltage may be applied or supplied.**
 IEC417, SYMBOL	**EXPLANATION: This marking indicates that the operator must refer to an explanation in the operating instructions.**

1–5 SPS390 SPECIFICATIONS

General

Number of Channels	Standard: two channels Optional: four, six or eight channels
Frequency Ranges	dc to 100 kHz full scale in 1, 2, 4, 5 sequence less 50 kHz range, two channels active
	dc to 40 kHz full scale 1, 2, 4, 5 sequence, four to eight channels active
Anti-Aliasing Filter	Standard on each channel with 120 dB/Octave rolloff
A/D Conversion	Ranges up to 40 kHz: 16 Bit Resolution - All channels parallel sampled
	100 kHz range: 12 Bit Resolution - Two channels parallel sampled
Sampling Rate	2.56 x upper frequency range
Maximum Composite Sampling Rate	819, 200 samples per second
DSP Operation	32 Bit 40 MHz Floating Point Primary Processor (20 Million Floating Point Operations per Second)
	16 Bit Secondary Processor for each channel pair (20 Million Operations per Second)
Dynamic Range (analog board type 1)	0.05 Vrms F.S. to 20.0 Vrms F.S. 0–40 kHz, >90 dB below F.S. with 8 avg.
	40 kHz–100 kHz, >80 dB below F.S. with 8 average
Noise Floor (analog board type 1)	0.05 Vrms F.S. to 20.0 Vrms F.S. 0–40 kHz >90 dB below F.S. with 8 average
	40 kHz–100 kHz, >80 dB below F.S. with 8 averages
Real Time Performance	>20 kHz real time rate on dual spectrum calculation
Full Scale Voltage Range	0.001 Vrms to 20 Vrms in 1, 2, 5 sequence with autoranging, independently selectable on each channel
Channel to Channel Match (analog board Type 1)	
Amplitude:	± 0.25 dB, 0–40 kHz, I mVrms F.S. to 1.0 Vrms F.S.
	± 0.5 dB, 0–40 kHz, 2 Vrms F.S. to 20 Vrms F.S.
	±0.5 dB, 40 kHz–100 kHz, 1 mVrms F.S. to 20 Vrms F.S.

Phase:	± 1.0°, 0–40 kHz, 1 mVrms F.S. to 1.0 Vrms F.S.
	± 3.0°, 0–40 kHz, 2 Vrms F.S. to 20 Vrms F.S.
	±3.0°, 40–100 kHz, 1 mVrms F.S. to 20 Vrms F.S.
Cross Talk:	0.05 Vrms F.S. to 20.0 Vrms F.S.
	0–40 kHz, >85 dB below F.S. with 8 avg.
	40 kHz–100 kHz, >75 dB below F.S. with 8 avg.
Input Impedance	1 MΩ shunted by less than 100 picofarads
Input Coupling	dc or ac (-3 dB at 0.5 Hz), selectable each channel
Constant Current Power (ICP®)	4 mA constant current, 28 Vdc maximum, selectable each channel
Overload Protection	100 Vpk input on each channel
Triggering	Internally selectable for any channel, single or repeat;
	External single or repeat
	Slope: Rising or Falling Edge
	Delay: Selectable pre- and post- trigger delay in one sample increments
Frequency Resolution	200, 400, 800, or 1600 lines selectable
Input Recorder Memory	Standard configuration 7.5 MB distributed between active channels
Replay Mode	Auto scan of input recorder memory within user defined boundaries at selected overlap factor.
	View time record or processed function results
Weighting Functions	Rectangular, Hanning, Harris Flat-top, Exponential with variable tau, and user selectable offset for beginning of exponential response window
Amplitude Interpolation	Utilizes Hanning window for maximum frequency accuracy and calculates the Flat-top equivalent to give maximum amplitude accuracy
Overlap Processing	Maximum overlap in real-time mode
	Selectable 0, 25, 50, 75, 90 or maximum for averaging or extended memory readout
Averaging Modes	Sum, Exponential, Peak, +1, peak frequency response in cross property mode using swept sine excitation, "N" ensembles selectable from 1-10,000 in integer steps
Floppy Disk Drive	Built-in 3.5 inch microfloppy drive
	Standard 1.44 MB format MS-DOS®

Hard Disk Drive	
Standard:	850 MB minimum
Optional:	1 GB, 2GB, 4 GB
Workstation CPU	
Memory	32-Bit and Integral Coprocessor (Intel® 486 or Pentium) with 8MB RAM minimum
Real Time Clock	On-screen display of date and time to 1 second resolution
	Annotation of time and stored records to 0.01 second resolution in waterfall memory
X-Axis Readouts	Hz, rpm, Seconds, and Orders (optional)
Y-Axis Readouts	Volts, EU, dB, dBV, dBR, with modifiers of magnitude, magnitude squared, and magnitude squared/Hz. User defined labels for EU up to 5 characters. dBref calculated and displayed for each channel
Y Units Select	English or Metric
Phase Offset	±180 degrees or 0° to 360° for all channels
Cursors/Markers	Locked cursors for like displays selectable.
	X-axis minimum and maximum boundaries, overall level, harmonics, peaks above threshold, maximum peak track, total harmonic distortion, interpolated amplitude and frequency, and user defined computed and displayed with selectable on-trace marker annotation.
View Window	User defined full scale minimum and maximum for both x- and y-axes in the selected units readout
	Y-axis default or autoscale selectable for each display
Text Entry	User defined text entry header and comment lines on any hardcopy available.
Transducer Sensitivities	
mV/EU	0.001 to 10,000 mV/EU
dB Ref	0 to 200 dB
Vref	1e-9 to 20 Vrms
EUlabel	User Defined (Up to 5 Characters)

Functions Performed

Time	Input memory for any channel or group (variable block length)
	Compressed input memory (up to 7.5 MB) for any channel
	Sync time average for any channel
	Orbit Display, 1 vs. 2, etc.
	Auto and cross correlation
Spectrum	Narrowband real-time, baseband or zoom
	Average display, baseband
	Sync spectrum average display
Cross Spectrum	Magnitude
	Phase
	Real and Imaginary
Cross Properties	Transfer Function (any active channel selectable as reference)
	Magnitude Phase Coherence Real & Imaginary Nyquist Optional: Multiple Input, Multiple Output (MIMO)
Mechanical Impedance Functions	Accelerance, mobility, compliance, stiffness, mechanical impedance, and dynamic mass with corresponding phase displays
Math Operations	Differentiation and Integration in EU
	Double differentiation and integration in EU
	Sum Product Difference Ratio Reciprocal Square Square Root (All functions to be performed on like data from any two channels)
Data Storage	Stores input record, processed data, or analyzer configuration limited only by available disk space. ASCII and binary formats utilized for internal data storage

Third Party Software Compatibility	Direct data exchange with SMS StarModal®, StarStruct® and StarAcoustics® software programs, for complete modal, acoustic, and structural analysis calculations and display. (Requires Analyzer/SMS Star Driver Option 42) ASCII data export of trace data Universal File Format (UFF) data export
Dynamic Data Exchange	Server for following values: Cursor X-value Cursor Y-value Overall level Record number RPM Fundamental frequency Magnitude Phase 2xRPM value Non-synchronous noise level Values are available for respective selected display
Hard Copy	Compatible with a wide variety of printers/plotters supported by Microsoft® Windows™ through the parallel printer port or serial port. Capture entire screen to clipboard and paste to report, print one or all displays on screen with information list and header. Print to output device or save graphic file to disk.
Operating System	Windows 3.11 or Windows® 95 can be the operating system for the SPS PRO Series analyzers. (Windows NT is not supported.) The entire operating sytem and PRO Series analyzer software packages supplied are year 2000 (Y2K) compliant. Analyzer opeation can be 100 % controlled with built-in trackball, pointer or external mouse. (Intelli-mouse operation is not supported.) External mouse must be connected at power-up to be recognized. If an external mouse becomes disconnected after power-up, the internal trackball will become active and lockout any reconnection of the external mouse. An external keyboard may be connected or disconnected at anytime before, during or after power-up.
Standard Ports	Mouse Port Parallel Printer Port External Keyboard Port VGA® Monitor Port RS-232 Serial Port

Networking	Operates with networks utilizing NDIS or ODI drivers (utilizes one ISA card slot, reduces maximum channels to 6 (Recommend using CE compliant network card)
Display	VGA® Displays
	Active matrix TFT color
	Display Resolution: 640x480
Display Windows	One to Nine Displays
	User configurable size, aspect, and location
	User selectable grids or ticks, linear and logarithmic
	Unrestricted, fully user selectable display/channel combinations

Zoom

Mode	Real-time or Average
Channels	One to eight active
Frequency Span	Selectable from 5 Hz to 40 kHz in a 1,2,4,5 sequence
	Span Center Frequency: Selectable from 3 Hz to 99.8 kHz in 1 Hz increments (limits are dependent upon frequency span)
Resolution	200, 400, 800, or 1600 lines

Waterfall

Channels	One to eight active
Spectrum Resolution	200, 400, 800, or 1600 lines
Amplitude Resolution	Full floating point precision
Source Data	Real-time or Averaged frequency domain data
Waterfall Record Capacity	Dependent upon user selections
	Example: 1 Channel at 400 Lines yields 4600 records
Waterfall Update	Continuous or Stop when Full
Waterfall Load Criteria	Continuous at Maximum FFT Rate
	Single Record Upon Command
	Delta Time (msec or sec)
	Delta rpm
	% Amplitude Threshold
	Average Recycle
	Exponential Average

Waterfall Display Window Size	Selectable from 2 records to greater than 200 per window, window can scroll through entire file
Waterfall Display Types	Cascade Single Record Peak Hold Envelope Profile (any frequency or SRA Order) Profile Overall Level
Z-axis Units	Record number rpm Time (sec)
X and Y-axis Units	Same as for analyzer display mode in linear or logarithmic format
Baseline Suppression	Programmable in 1% amplitude increments
Waterfall Display	
Skew	±45, ±30, ±15, and 0 degrees
Direction	Up or down
Display Setups	Independently selectable for each channel

Signal Source Generator (-15 Option)

Analog Output Signals	Pseudo Random: to 100 kHz bandwidth White Noise: over 100 kHz bandwidth with a selectable RMS output from 10 mV to 2.5 V RMS in 5 mV steps Pink Noise: over 100 kHz bandwidth with a selectable RMS output from 10 mV to 2.5 V RMS in 5 mV steps Burst Random: white noise output with a burst duration equal to 50% of the selected memory period Swept Sine: programmable amplitude from 10 mVpeak to 10 Vpeak in 5 mV increments from 0.5 Hz to 50 kHz (linear or logarithmic sweep) Sine Dwell: programmable fixed frequency and amplitude level
DAC Output	16 Bit Resolution
Sync Pulse Output on a BNC	A TTL pulse corresponding to the start of each frame.

Output Impedance and DC Offset	<250 ohms and 5 mV
Harmonic Distortion and Spurious Noise	More than 60 dB down from the fundamental signal amplitude
Sweep Rates and Cycles	Linear 1.0 to 999 Hz/second
	Logarithmic 0.1 to 10 Octaves/minute
	Single, Repetitive, Up and Down from 1 - 99 cycles
Output Controls	Noise: Start and Stop Sine: Start and Stop Sweep: Up and Down
	Sweep: Hold and Resume
Operation	Control and operation of the signal source is independent of the analyzer setup and processing function

Signature Ratio® Analysis (-16 Option)

Selectable Orders	1 to 200 Full Scale
Maximum Input Voltage	±20 Vpeak
Tachometer Freq Range	1 to 5000 Hz
Tachometer Tracking Range	300 rpm to 120,000 rpm
	User selected by start and stop rpm values set
Tachometer Trigger Threshold	±0.5 Vpeak
Minimum Tachometer Pulse Width	20 µs
Tachometer Input Impedance	100 kΩ
Tachometer Readout Accuracy	±0.1% of true rpm or ±1 rpm, whichever is greater.
Tachometer Pulses per Rev	0.5 to 999 (selectable to 3 decimal places)
Tachometer Slew Rates	Slew rates will be dependent on START and STOP tracking range, specified delta rpm, and tachometer pulses per revolution
Tracking Ratio	16 to 1 over selected rpm interval
Frequency Resolution	200, 400, or 800 lines
Number of Channels Simultaneously Tracked	One to eight
Analysis	On-line or replay of transient acquisition time history and tachometer
Display Types	3-D cascade display

Peak hold envelope spectrum of entire array

Selected single spectrum; amplitude *vs* order

Profile overall level *vs* rpm

Profile selected order *vs* rpm

(Start and stop rpm independently selectable for each display)

Octave Analysis (-41 Option)

Conforms to ANSI S1.11-1986, Order 3, Type 1D, extended and additional frequency ranges for:

1/1 Octave (at center frequency)

Center Frequency (Hz)	Band Number
1 – 1000	0 – 30
2 – 2000	3 – 33
4 – 4000	6 – 36
8 – 8000	9 – 39
16 – 16000	2 – 42

1/3 Octave (at center frequency)

Center Frequency (Hz)	Band Number
0.75 – 1250	-1 – 31
1.6 – 2500	2 – 34
3.15 – 5000	5 – 37
6.3 – 10000	8 – 40
12.5 – 20000	11 – 43

Dynamic Range	70 dB down from Full Scale Typical (1/3 Octave)
Display Ranges	1/1 Octave, 11 Bands 1/3 Octave, 33 Bands
Update Rate	25 per second (1/3 Octave mode for one or two Channels 20 kHz, typical)
Acoustic Weighting	Flat, A, B, C, or D on all channels
Averaging Mode	Selectable in Seconds Linear or exponential method
Marker Readout	X-axis: Hz and Band Number
	Y-axis: V, EU, dB, dBV, dBR, and Overall Level (OA)
	Allows any two active channels to be utilized as references in cross property measurements (Channels 1 and 2 are default)

Remote Control (-58 Option)

Terminal Control Functions	Start averager
	Stop averager
	Resume
	Hold
	Update

	Select display
	Export data
	Send trace data to RS-232C port
Remote Analyzer Emulation Functions	All analyzer functions and operations are available on replicated screen of remote site
Communications	Direct: via null modem cable from analyzer to analyzer or analyzer to computer (RS-232C to RS-232C port)
	Modem: via RS-232C to CE approved external modem, telephone line, and modem to RS-232C from analyzer to analyzer or analyzer to computer/terminal

Physical Characteristics

Dimensions	17.25 in. W x 9 in. H x 13 in. D 43.8 cm W x 22.9 cm H x 33.0 cm D
Weight	27 lb. typical (12.3 kg)
Power	100-240 V~ ±10 %, 2.5 A, 50-60 Hz 120 V~ ±10 %, 2.5 A, 400 Hz

Environmental Characteristics

Temperature	+5° to +45°C operating −10° to +60°C non-operating
Humidity-maximum relative	80% non-condensing for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
Shock and Vibration	
Operational Shock:	5 Gpk, 11 msec 1/2 sine pulse 3 axis
Non-operational Shock:	-40 Gs, halfsine 11 msec, 6 axis, 8 corners
Operational Vibration:	5-27 Hz 0.025 in DA, 28-500 Hz 0.5 Gpk
Altitude – Operating:	0 to 2000 m

Fuse — 240 V~ Operation

Number required	2
Rating	T4A/250V

Fuse — 120 V~ Operation

Number required	1
Rating	T4A/250V

NOTES

2– INSTALLATION

2–1 INTRODUCTION

This section contains instructions for performing an initial inspection of the Model SPS390, general safety precautions, instructions on preparation for use, return shipment procedures including repacking instructions for return shipment, and procedures for claiming warranty repairs.

2–2 INITIAL INSPECTION

Although the instrument is thoroughly inspected mechanically and electrically before packing for shipment, it must be inspected upon receipt for possible damage in transit.

2–2.1 SHOCKWATCH Monitors

If the shipping containers are equipped with SHOCKWATCH monitors, check the condition of the monitors before opening the containers. If the monitor indicates rough handling, follow the instructions on the SHOCKWATCH label.

2–2.2 Unpacking

Use care when removing the instrument from its shipping container to prevent damage to the front and rear-panel controls. Save the shipping container and all packing materials until the instrument has been thoroughly inspected for damage and checked for proper operation.

2–2.3 Equipment Furnished

Make sure that each item on the packing list is included with the shipment. Accessory kits may be shipped in separate containers.

2–2.4 Inspection for Physical Damage

Inspect all panels for dents, signs of chipped paint, or scratches. Check for broken or bent connectors, switches, and knobs. Photographs of damage may be helpful in substantiating subsequent claims.

2–3 RESHIPMENT PROCEDURE

If the instrument is to be reshipped after receipt, use of the original shipping container and packing materials is recommended. If original packing materials are not available, the following materials should be used:

CAUTION

The use of flowable styrofoam packing materials (i.e., popcorn, peanuts, shells, and spaghetti), is a leading cause of equipment damage during shipping. Any shipping damage resulting from the use of flowable packing material by the customer will be charged to the customer.

- A double wall carton with a test strength of 350 pounds and of sufficient size to accommodate the required packing.
- Heavy paper or sheets of cardboard to protect all surfaces.
- Nonabrasive material such as polyurethane or cushioned paper between projecting parts and wall of carton.
- At least 4 inches of shock absorbent material such as extra firm polyurethane.

2–4 RETURNED EQUIPMENT WITH WARRANTY OR DAMAGE CLAIMS

If the equipment is found to be damaged in transit or does not operate as specified when received, notify the carrier and the nearest Signal Processing Systems Product Customer Service office or representative by calling 1-800-VIB-TEST. The representative will arrange for repair or replacement of the system component.

2–5 PREPARING THE SPS390 FOR USE

This section describes pre-operational equipment interconnection, cooling, and power requirements.

2–5.1 Equipment Interconnections

If the SPS390 requires interconnection to customer furnished equipment, the initial interconnection, and any subsequent changes, should be performed by qualified personnel.

2–5.2 Power Requirements

The SPS390 auto sensing power supply is designed to operate on ac line power from 100-240 V~ ±10 %, 2.5 A, 50-60 Hz or 120 V~ ±10 %, 2.5 A, 400 Hz. The line power circuit should be rated at 15 Amps or more. Before applying power to the instrument, make sure the fuse in the fuseholder is a 4 Amp Slo-Blo.

2–5.3 Wiring Requirements

The SPS390 is provided with a 15 Amp power cord (12 gauge wire).

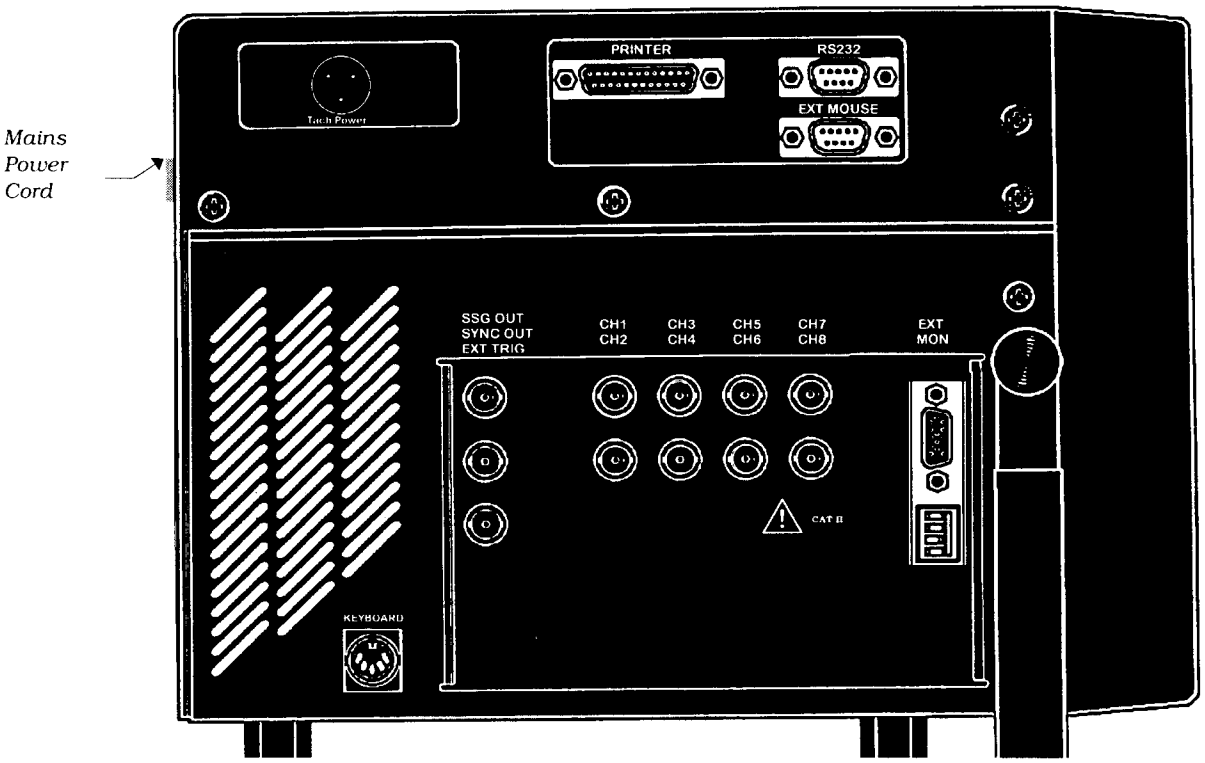
2–5.4 Cooling and Ventilation Requirements

Install the SPS390 upright on a flat surface in a well ventilated location. Provide minimum of four inches of clearance on the sides and rear to allow cooling air to enter ventilation grills and to be freely exhausted by the cooling fan.

2–5.5 Panel Connectors

Located on the left side of the SPS390 (see figure 1) are various signal connectors and interface connectors. Figure 2 describes these connectors and the signal characteristics.

Figure 1. SPS390 Side Panel Connectors



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2–5.5.1 Description of the Side-Panel Connectors

Figure 2. Description and Characteristics of the SPS390 Input/Output Connectors

⚠ Connector	Voltage Range	Frequency Range	Description
SSG OUT	±10 Vpk	0 - 100 kHz	With the SSG Option installed, the SSG OUT BNC connector provides one of five types of signal outputs. The output signal type and amplitude are controlled by the Noise Generator and Sine Generator Setup menus.
SYNC OUT	±10 Vpk	0 - 10 kHz	A TTL trigger output coincident with the start of each random sequence is provided at the SYNC OUT BNC connector. Each sequence length matches the memory period of the analyzer. This output can be used as the SYNC TIME trigger input for the SYNC TIME averaging functions.
EXT TRIG	±20 Vpk	0 - 5 kHz	The EXT TRIG Connector is for applying an external trigger or tachometer signal. This connector can accept either an ac coupled or dc coupled signal.

⚠ Connector	Voltage Range	Frequency Range	Description
CH1 →CH8	20 Vrms	0 - 100 kHz	These connectors accept the input analog data signals for Channels 1 through 8. The number of connectors available depends on the installed channels.
EXT MON	Standard PC video VGA output connector.		The EXT MON connector is a standard 15-pin VGA RGB connection. Refer to the figure 3 table for pin assignments.
KEYBOARD	Standard PC keyboard connector.		The keyboard connector accepts a standard 5-pin DIN male connector. Refer to the table of figure 4 for pin assignments.
Tach Power	+5 Vdc, 1A +15 Vdc, 0.1A		Optional feature for powering SPS630 or IR Tach Head.
PRINTER	Standard PC video VGA output connector.		The printer connector accepts a standard 25-pin parallel printer cable. Refer to the table of figure 5 for pin assignments.
RS232	Standard PC serial port.		The RS232 Connector is a DB9-pin connector that satisfies RS-232-C requirements. This connector provides interface capability with various RS232 devices. Refer to the table of figure 6 for pin assignments.
EXT MOUSE	Standard PC mouse port.		Standard connector for an external serial mouse.

Figure 3. External Monitor (EXT MON) Connector Pin Assignments

PIN #	I/O	Assignment	Mono Use	Color Use
1	>	Red		Red
2	>	Green	Mono	Green
3	>	Blue		Blue
4		Reserved		
5		Digital Ground	Self Test	Self Test
6	<	Red Return	Key	Red Return
7	<	Green Return	Mono Return	Green Return
8	<	Blue Return		Blue Return
9		Plug		
10		Digital Ground	Ground	Ground
11		Reserved		Ground
12		Reserved	Ground	
13	>	Horizontal. Drive	Horiz. Drive	Horiz. Drive
14	>	Vertical. Drive	Vertical. Drive	Vertical. Drive
15		Reserved		

Figure 4. Keyboard Connector Pin Assignment

Pin #	Assignment
1	+ Keyboard Clock
2	+ Keyboard Data
3	– Keyboard Reset
4	Ground
5	+ 5 Volts

Figure 5. Printer Connector Pin Assignments

Pin #	I/O	Assignment
1	<>	- Strobe
2	>	+ Data Bit 0
3	>	+ Data Bit 1
4	>	+ Data Bit 2
5	>	+ Data Bit 3
6	>	+ Data Bit 4
7	>	+ Data Bit 5
8	>	+ Data Bit 6
9	>	+ Data Bit 7
10	<	- Acknowledge
11	<	+ Busy
12	<	+ Paper End
13	<	+ Select
14	<	- Auto Feed
15	<>	- Error
16	<>	- Init. Printer
17	<	- Select Input
18-25		Ground

Figure 6. RS232 Connector Pin Assignments

Pin #	Assignment	
1	DCD	(Data Carrier Detect)
2	RX	(Receive Data)
3	TX	(Transmit Data)
4	DTR	(Data Terminal Ready)
5	GND	(Signal Ground)
6	DSR	(Data Set Ready)
7	RTS	(Request To Send)
8	CTS	(Clear To Send)
9	RI	(Ring Indicator)

2–6 SPS390 ANALOG CIRCUIT CARD ASSEMBLY CONFIGURATION

The SPS390 analog card has two possible configurations installed: Type-0, a 2-channel through hole type and Type-1, a 2–channel surface mount type. Either type may be installed in the unit but not mixed in the same chassis. Each is configured for the installed slot by jumper straps. Verify the strapping prior to installation of a new card. Figure 2–1 and 2–2 show the correct strappings.

Be sure to contact the Customer Service Department, at 1-800-VIB-TEST to obtain a Returned Material Authorization (RMA) Number prior to returning any equipment. Please attach a card to the component that shows the RMA Number, your company's name, address, person to contact, and telephone number. A short description of the damage or problem will also be helpful.

2–7 SOFTWARE REINSTALLATION

The SPS390 application software is factory installed on the system. The SPS390 software package provided with the original system consists of backup copy of the application software on 3.5 inch microfloppy disks. Keep the backup disks in a safe place.

The PROseries analyzer features/functions described in this manual represent the capability of the Model SPS390 through software release version 3.8 inclusive.

If the backup disks are misplaced or a set of the latest revision of software is desired, contact your area representative or the factory customer service department for replacement copies.

The setup program installs all of the main application and components that are necessary to operate the SPS390, (i.e., files, folders and program icons).

The steps are the same whether installing the application for the first time, upgrading from an earlier version or re-installing the application.

To install or re-install the SPS390 program, perform the following steps:

Step	Action
1.	Turn off virus-detection and screen-saver software, if being used. This frees up memory for installation and prevents possible conflicts between the SPS390 installer and other programs that may be installed.
2.	Insert the SPS390 application disk into the disk drive a: (front panel micro floppy 3.5" disk drive).
3.	Start the setup program from the windows program manager (windows 3.11) or from Windows 95 choose **Start>Settings>Control Panel** and then double-click the **Add/Remove Program** option.

	double-click the Add/Remove Program option.
4.	**During the** Setup **procedure, you will be prompted to obtain and insert any option software programs that you may have purchased.**
5.	**When the Setup program is complete, the system software is fully installed.**

Figure 2-1. SPS390 Analog Card — 2 Channel Through Hole — Type 0

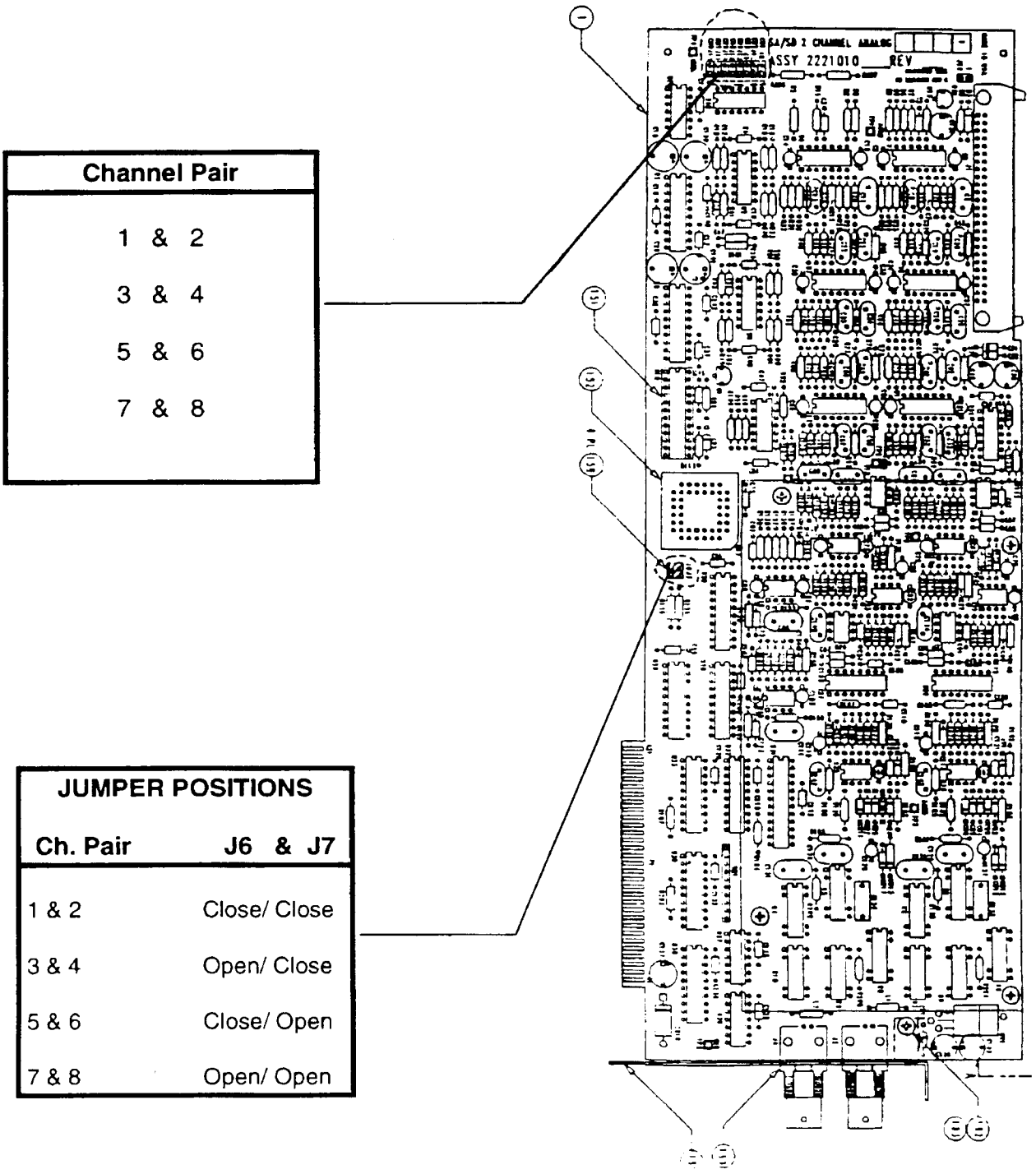
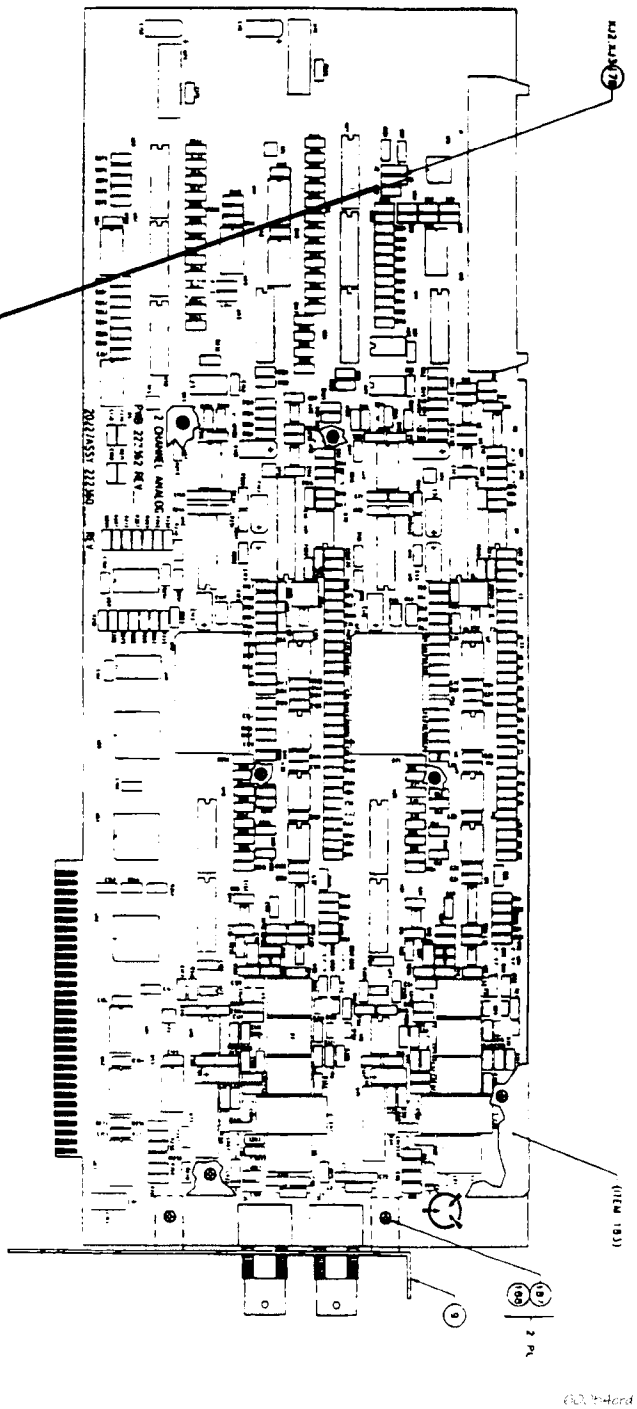


Figure 2-2. SPS390 Analog Card — 2 Channel Surface Mount Type 1

JUMPER POSITIONS	
Ch. Pair	**J2 & J3**
1 & 2	Close/ Close
3 & 4	Open/ Close
5 & 6	Close/ Open
7 & 8	Open/ Open



Notes

3–OPERATION

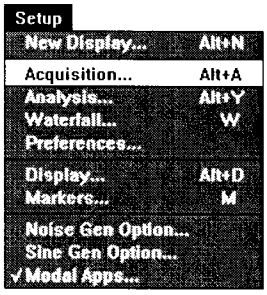
3–1 QUICK START

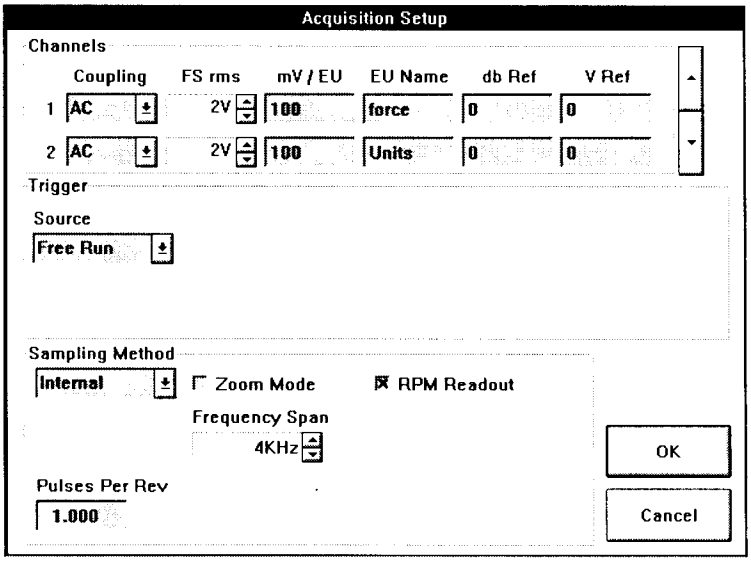
The SPS390 is an extremely flexible system that offers many configuration, acquisition, analysis, and display options. This Quick Start provides a concise approach to a *typical* data acquisition, analysis, and display task, showing the menus and dialogs to be accessed and the order in which to access them. However, this procedure can differ, depending on the application. As you work with the SPS390, the setup procedures for your particular applications will quickly become second nature.

➲ *SPS390 HINT:* ***Before tackling a particular acquisition/analysis task, ask yourself the following questions, in the order shown. They provide a useful guide in deciding how best to proceed.***

What Signal Am I Going to Acquire?

The **Acquisition Setup** menu is typically a good starting point:

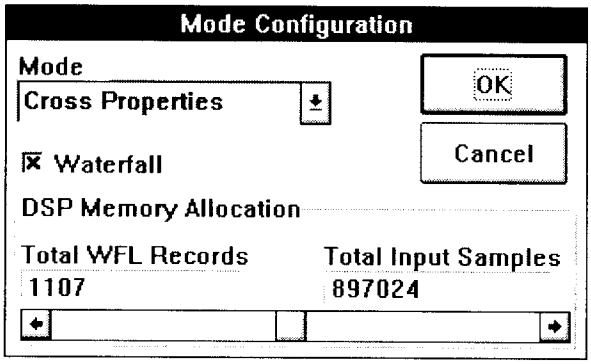




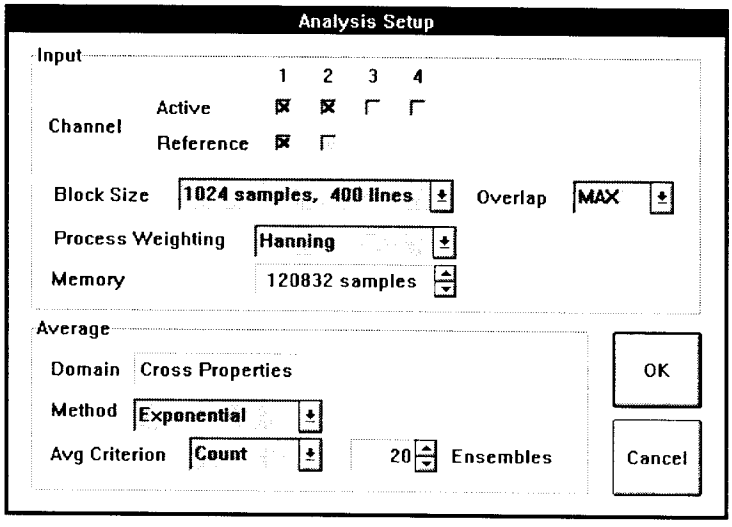
Using this dialog, you can configure the SPS390 input channels setup, trigger conditions, sampling method, etc.

What Am I Going to Do with the Acquired Signal?

Use the **Mode Configuration** dialog to control the "personality" of the analyzer. This dialog lets you select the mode of operation, which controls the types of display and analysis possible. To select it, click on Mode in the main menu. Then choose the desired mode of operation. If you want to disable the waterfall display capability, click in the **Waterfall** checkbox on this dialog to delete the X.

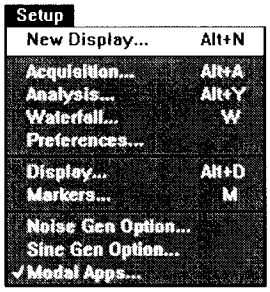


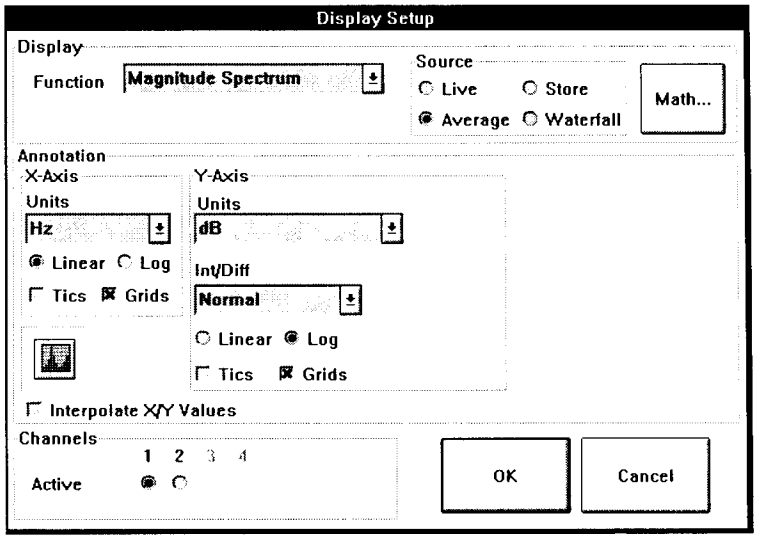
Next, access the **Analysis Setup** dialog from the **Setup** menu, to configure the analysis parameters for your application and select the active channels to be used for data acquisition.



What Do I Want to Display?

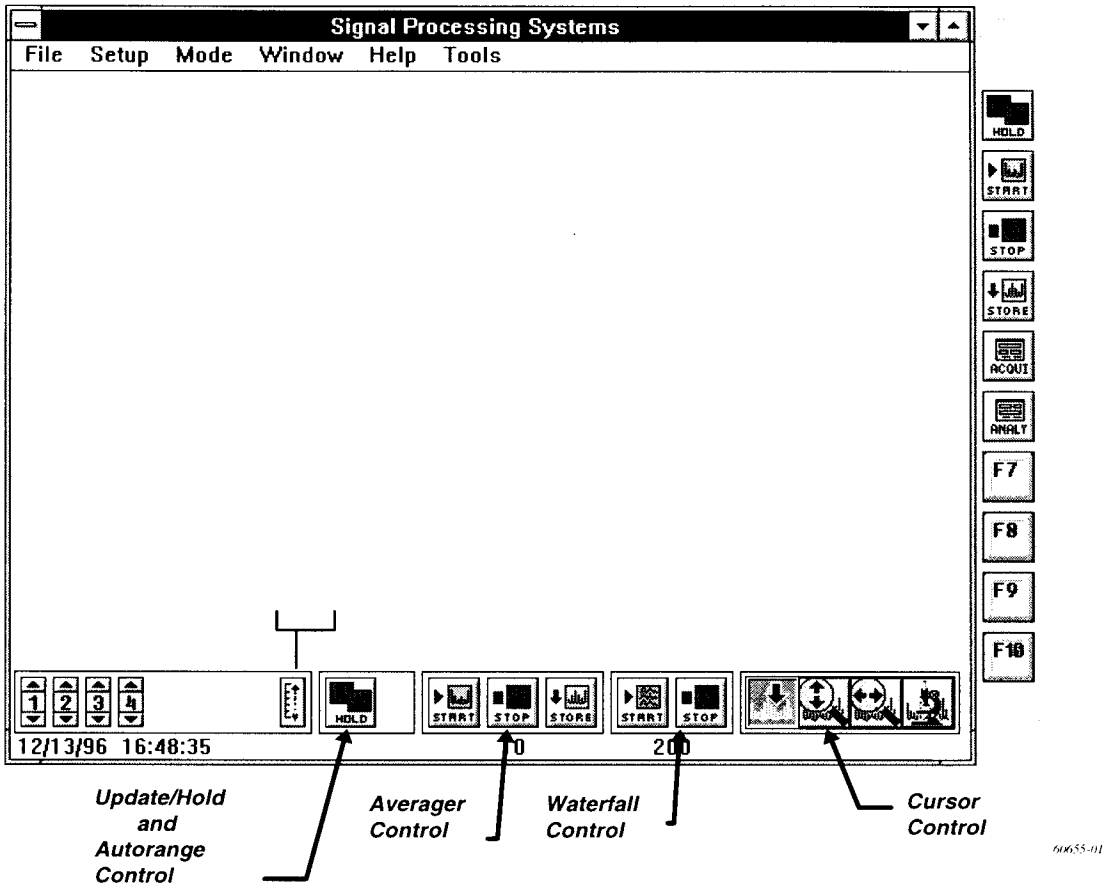
Choose **New Display** on the **Setup** menu to bring up the **Display Setup** dialog, which lets you configure the display to suit your needs.



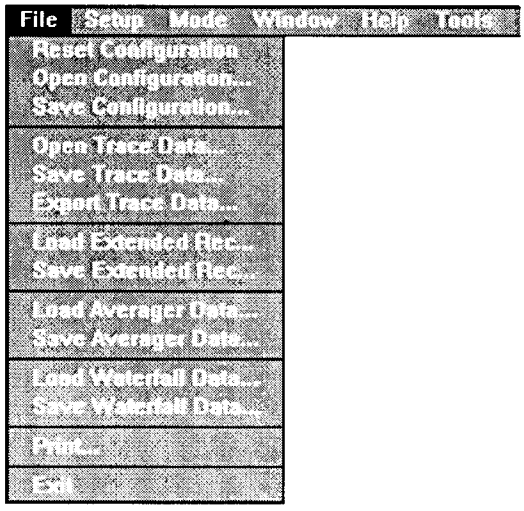


Here, you specify the display parameters for each window to be used. (Up to 9 windows can be open at once, each with its own distinct set of display parameters.). The **Function** and **Channels** to be displayed, display source, **X**– and **Y–Axis** scale and **Units**, **Interpolation**, and **Math** functions to be performed are all selected here.

At this point, your system is properly configured, and you can begin your measurement, using the control buttons on the screen. (Note that here the control buttons appear at the bottom of the screen; the default screen has the controls at the top. The Preferences dialog under the Setup menu allows you to specify button placement.)



When the measurement is complete, you can save it to disk or print out a hard copy, depending on your needs. Use the options under the File menu to select your output method.



3–2 GETTING STARTED

To operate the SPS390, use the trackball to move to one of the four function areas of the SPS390.

- Main menus
- Function keys and controls
- Displays
- Status area

Once you have selected a function area, use the trackball selector button to choose the desired operation.

3–2.1 Main Menus

You select functions from these menus by moving the selector cursor (indicated by an arrow) to the desired menu by moving the trackball, then selecting the desired menu function by pressing the trackball selector button. Menu functions may invoke an operation or present a dialog box. Parameter entry into a dialog box is made by using the trackball to scroll through predefined choices, or selecting options, or by entering alphanumeric responses. Parameters are validated, and the SPS390 provides "hints" if you attempt to enter incorrect parameters. All dialogs are then confirmed (OK), or canceled without modification by moving the selector cursor to the appropriate response and pressing the trackball selector button.

3–2.2 Function Keys and Controls

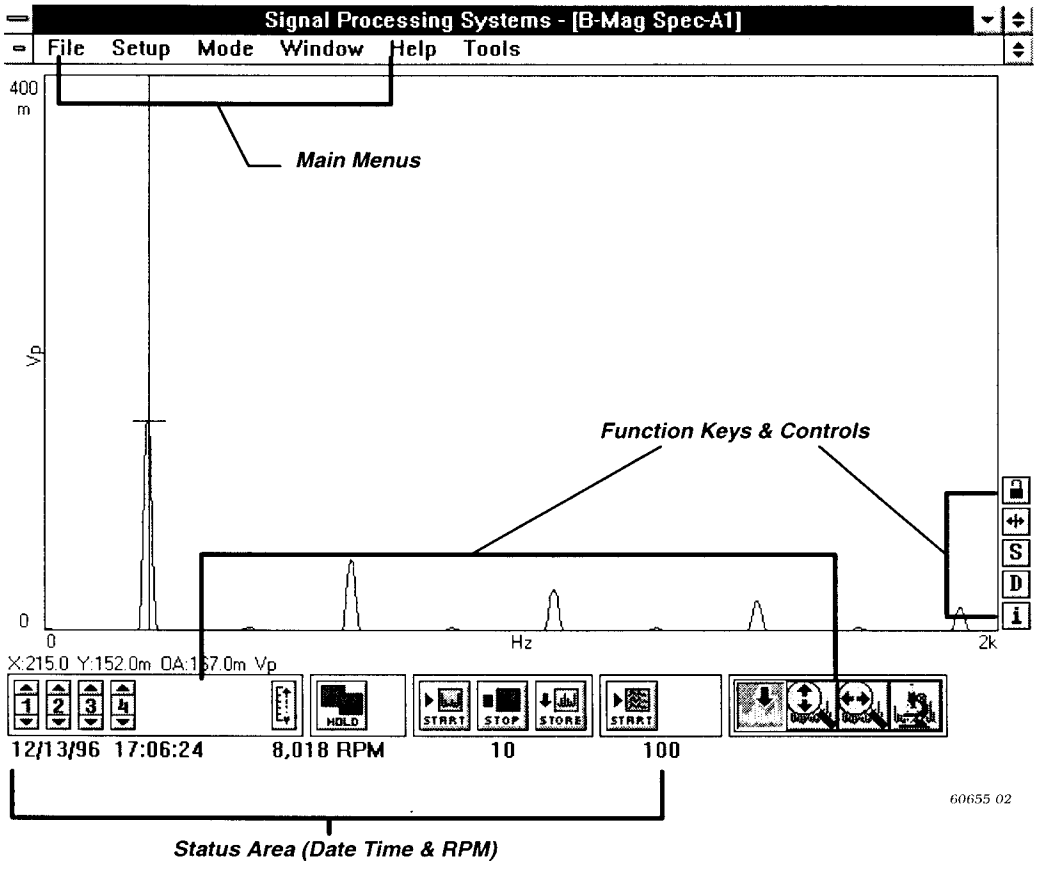
Function keys and controls are accessed by moving the selector cursor over the desired function or control, then pressing the trackball selector button. A visual cue, such as a change in function key color or function name, such as Update to Hold, or specific identifiers, such as a change from the selector cursor to a frequency indicator or line cursor, will result from a valid action.

3–2.3 Displays

Up to nine simultaneous data displays (called traces) can be created in virtually any format, size, and style. You have complete control over the viewing area and can maximize or iconize any trace, and change any trace parameter at any time. Trace windows also contain their own specific display controls that cause specified action local to the selected trace window.

3–2.4 Screen Status Area

The status area is to provide information. There are no user actions resulting from moving the selector cursor in this area.



3–3 OPERATING MODES

The SPS390 can operate from two signal sources:

Live acquisition from analog signal sources,

and

Playback of previously acquired (recorded) digital data residing on internal disk storage. The analyzer can also operate in various analysis Modes allowing selection of the most appropriate method of data collection and analysis.

3–3.1 Data Source

Live Acquisition

The SPS390 is provided with a factory default system configuration which initializes acquisition, analysis, and display parameters. When first turned on, the SPS390 uses this configuration and starts operating in live acquisition mode. You may then control analyzer functions by using the various controls such as Update/Hold, AVG Start, selecting frequency span, or reconfigure any of the SPS390 parameters such as display type, analysis resolution, or acquisition mode to suit your particular requirements.

When in the update mode, time domain data is continually acquired into the SPS390 XRec memory, and processed on a block basis (determined by FFT spectral resolution and overlap), which is controlled by a digitizing clock and trigger. As data is being acquired, LIVE spectral processing and averaging can occur, creating data sources for display. All calculated and displayed data is in 32-bit floating point precision, yielding a dynamic range in excess of 90 dB.

Although the data is acquired into each channel's recorder memory at precisely the same time, data is displayed in each trace display window serially while the SPS390 is in Update. This may result in the appearance of non-coherent data. However, as soon as the system is placed in Hold, all active display windows are updated with synchronous, coherent data from the same instant in time. When using single-triggered mode, the system is placed into Hold after the trigger event is detected.

In the FFT mode, the SPS390 can achieve a sampling rate of 256 kHz for two channels, yielding an effective spectral frequency range of 100 kHz for two channels. For three or more channels, the highest frequency range is 40 kHz. In Octave mode, the maximum center frequency for the top band of the selected analysis is 20 kHz.

Playback

Live acquisition and processing occurs while the SPS390 is in Update mode. When placed in Hold, the SPS390 can enter playback mode in order to review or reanalyze data that has been stored in the XRec memory.

Instead of acquiring live data from a signal source, data is "played back" from the XRec memory, and most analysis and display functions are available as though the data were live. The only restraint is that there has been a finite amount of data recorded, and certain functions stop automatically when the end of data is encountered.

Playback mode is entered by manipulating the standard cursor on compressed time displays — displays that show the contents of the XRec memory. Positioning the cursor places an internal pointer at the start of the desired block of data, and all appropriate analyses are performed and displays are updated to reflect the information contained in the specified block. Multiple blocks can be reviewed manually, or automatically by setting limits.

3–3.2 Analysis Modes

Different modes of collecting and analyzing data can be specified by using the **Mode Selector** from the SPS390 **Main** Menu. The standard modes are FFT-based analysis modes, which include optimizing spectrum modes to provide increased real-time efficiency. If the octave analysis option is installed, the octave filter-based analysis mode is also available. The extended recorder is available in all modes, except the **Octave** mode. Time domain displays are inhibited in the octave, SRA, and zoom modes.

Correlation

Correlation mode enables automatic and cross correlation measurements, used to understand certain signal relationships in the time domain and to give an accurate assessment of signal delay time between two observation points. Correlation measurements can be performed with either linear or exponential averaging. peak averaging is not available for correlation measurements.

Cross Properties

The cross properties mode is the default mode which results in the most versatile use of the SPS390 in spectrum mode, in that all analyses and displays (except for sync spectra) are available. The cross properties averager is enabled, which allows averaging of power and cross property data.

Octave (Option)

The octave mode enables 1/1 and 1/3 octave analysis in place of narrow band Spectrum analysis. Discrete digital filters are used to compute the amplitude levels of the selected bands. Only octave spectrum displays are available.

Spectrum

The spectrum mode is used when only time and spectral data is required. It conserves internal resources, and allows very high real time rates for live and averaged spectral processing. It is also the method of choice when zoom is required on power spectrum data.

Sync Spectrum

The sync spectrum mode is used when time synchronized averaging is required. The time domain averager is enabled, and live time, spectrum, and averaged time and sync spectrum data are available.

3–4 EXTENDED RECORDER MEMORY

The SPS390 has a very large DSP dynamic RAM memory, which can be used for different purposes in different analysis modes. The amount of selected memory, in addition to the selected mode, can provide increased performance of the analyzer for particular measurements.

The Extended Recorder (XRec) memory of the SPS390 can contain over 400,000 samples of time domain data (for 1 MB configurations) to 3.6 million samples of time domain data (for 8 MB configurations) depending upon selected analysis parameters. The total amount of available XRec memory is divided by the number of active channels, and is user selectable from 8192 samples to the maximum displayed on the **Analysis** Dialog for a specific setup. In addition to recording time data to internal memory for playback or storage, the selection of the amount of available XRec memory will influence the level of zoom above 10 kHz and the delay for triggering. (For more information on these topics, see More On Extended Recorder Memory in Section 8.)

Incoming signals are digitized and entered into XRec memory on a continuous basis while the SPS390 is in **Update** mode. Extended recorder memory is a circular buffer— meaning that when the last location is filled data wraps around to the beginning of memory so that the XRec memory always contains the most recent data. When the SPS390 is placed in Hold, the XRec memory is unwrapped so that the most recent data appears to the right on a time trace, and block 0 is the least recent block that will be processed.

In the **Free Run Trigger** mode for frequencies less than 40 kHz, data continues to fill the XRec memory until **Hold** is pressed. When the SPS390 is operating at 40 kHz or 100 kHz, only 1 block of data is acquired into XRec memory. In any triggered mode, for ALL frequencies, data is acquired into XRec memory until a trigger event (the trigger plus the specified delay) is detected. For single trigger, acquisition stops when the XRec buffer is full, after the trigger event is detected, and the SPS390 automatically goes into Hold. For Multiple Trigger, the trigger event is processed and acquisition continues.

As trigger events can be random, the XRec memory may contain varying trigger events when the event is less than the size of XRec. You cannot calculate the number of events from the block size and delay, when using multiple trigger.

To fill the XRec memory in the 40 kHz and 100 kHz modes, use **Single Trigger** mode and set the delay to the negative number of desired samples. Be sure to set the trigger threshold to a value that will ensure that acquisition begins when Update is pressed. Acquisition will automatically stop when the number of samples, plus one block, has been acquired.

☞ *Additional topics on Extended Recorder Memory can be found in sections 4 and 6.*

3–5 WATERFALL MEMORY

Many functions processed by the SPS390, including spectra, transfer functions, coherence, and cross-spectra, can be viewed as cascade or three-dimensional waterfall displays. This type of display can be extremely useful; it often serves as the first step toward identifying a complete RPM tracking display for each significant harmonic order of running speed, for example.

When the **Waterfall** mode is enabled, the available system memory can be divided between XRec memory and waterfall memory as a percentage of total analyzer memory. This enables you to optimize memory usage for the type of analysis required, or to devote all of the SPS390 memory to store waterfall data.

Waterfall data is stored in memory as precision data resulting from an analysis operation. The results from a one-block analysis are stored as one waterfall record. Any number of active channels can be waterfalled simultaneously (and in addition to other analyzer operations), but only one analysis type, or waterfall function, can be processed during a waterfall load operation. The complex waterfall selection allows the magnitudes of all active waterfall channels and the phase values between the active channels and the reference channel to be stored into waterfall memory.

There are many options as to how data is loaded into waterfall memory and a versatile array of display features for retrieving data from waterfall memory. Data in waterfall memory can be stored to disk and later recalled from disk for further analysis.

Like the XRec memory, waterfall memory is a dynamically allocated resource, and the amount of waterfall memory will vary depending upon system configuration, the number of active channels, and other analysis and acquisition parameters.

3–6 DATA BUFFERS

3–6.1 Overview

In addition to XRec memory and waterfall memory there are three classes of data storage, or memory areas that contain data that has been converted from the XRec memory to the specified units, or calculated quantities:

- Live, or Real Time
- Averaged
- Stored Average, or Store

The number and size of these internal data areas are dynamically allocated based on the selected analysis mode and parameters set on the **Analysis Setup** dialog. The contents of these buffers may be cleared when the mode configuration changes or when particular analysis parameters change.

Just as important, selecting the appropriate analysis mode affects the types of analyses and displays that can be produced and influences the real-time rate of the SPS390. The standard mode selections are:

Correlation

This mode enables auto and cross correlation measurements.

Cross Properties

This is the default mode that results in the most versatile use of the SPS390 in spectrum mode, in that all analyses and displays (except for sync spectra) are available.

Spectrum

This mode is used when only time and spectral data are required. It conserves internal resources, and allows very high real-time rates for Live and averaged spectral processing. Published real-time rates for the SPS390 are for this mode.

Sync Spectrum

This mode is used when time synchronized averaging is required.

Octave

This mode enables 1/1 and 1/3 octave analysis. Discrete digital filters are used to compute the amplitude levels of the selected bands.

3–6.2 Analysis Parameters

At a minimum, the live time data buffer is always available. This allows live display of all analyses except those that do not produce meaningful data unless averaged, such as transfer function and coherence.

See the section on Display Setup for a table of valid domain/display selections. When you set parameters for Display Windows, only the valid choices of displays based on the selected averager domain are presented.

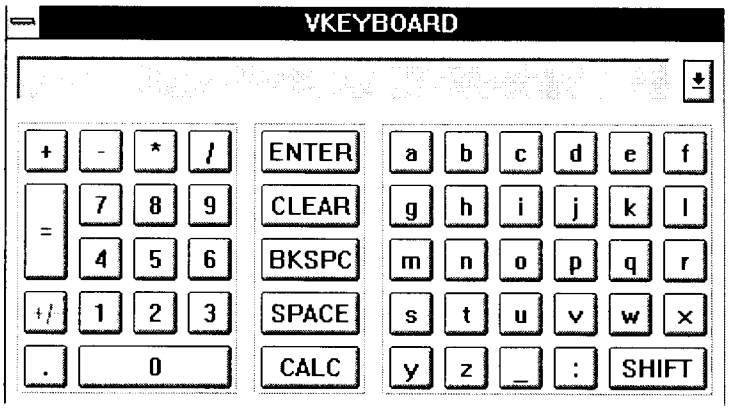
The following table shows which analysis parameters, if changed, invalidate the indicated data buffers.

Parameter	Invalidates Data For:
Active Channel List	Extended Recorder, Live
Block Size, Resolution	Averager
Weighting	Averager
Overlap	Averager
Averaging Method	Averager
Averager Domain	Averager

☞ *Changing Analysis modes will invalidate the data in the live and averager buffers. Also, when the data buffer becomes invalid, a descriptive message will appear in the appropriate display window.*

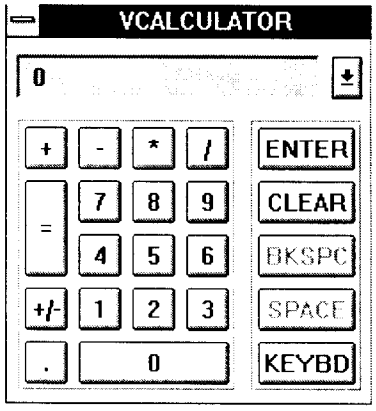
➲ ***SPS390 HINT:*** *Changing any of the parameters that affect the Averager Memory will cause the contents of the Averager to be lost as soon as OK is selected from the Setup Dialog. To retain the contents of the Averager, select Average Store before changing the parameter(s). Of course this will replace the current contents of the store memory.*

3–7 VIRTUAL KEYBOARD AND VIRTUAL CALCULATOR



The virtual keyboard is a template of alphanumeric characters that can be selected using the trackball cursor and selector button. It is useful for entering parameters such as transducer sensitivities, Engineering Unit (EU) names, and reference levels. Whenever text entry is required, double click on the text entry box of the dialog to invoke the virtual keyboard (except when storing and retrieving named files — a Windows™ function). Then, position the trackball cursor arrow over the desired character, and press the selector button to select the character. When all the desired characters are selected, place the arrow cursor over the **ENTER** key, and press the selector button to enter the characters. The **SHIFT** key can be used for entering either upper or lower case letters.

You can use **BKSPC** to delete characters, or **CLEAR** to delete all characters. If you want to exit the virtual keyboard without modifying the existing text, click on the virtual keyboard close icon located at the top left of the virtual keyboard window.



Whenever numeric entry is required, the virtual calculator can be used instead of the virtual keyboard. The virtual calculator operates similarly to a desktop calculator, and allows you to enter numeric values, or compute numeric quantities, which can be used as parameters. You may switch between the virtual keyboard and the virtual calculator by using the **KEYBD** and **CALC** buttons on the respective virtual device.

3–8 FILES

Various files can be created and used by the SPS390. These files are in two categories:

- Configuration files
- Data files

3–8.1 Configuration Files

Configuration files store the acquisition setup, waterfall setup, display setup, and analysis setup parameters. The SPS390 convention is to append **".cfg"** to the name of configuration files. The SPS390 can maintain multiple configurations on disk, and configurations can be switched at any time.

☞ *Configuration files are for use only with the* **Save** *and* **Open** *configuration commands.*

3–8.2 Data Files

There are five types of data files:

- Trace files
- Export files
- Extended recorder files
- Averager data files
- Waterfall data files

Trace Files

Trace files contain the data and display setup parameters from trace display windows. The data is maintained in internal format for use by the save and open data commands. Data is stored with default parameters that were set when the data was saved. When trace files are recalled, scaling and display parameters may be changed, but the data itself cannot be modified. Note that the current analyzer configuration is not changed when a trace file is recalled.

The SPS390 convention is to append **".trc"** to the name of trace data files. These files contain a text header that describes the data in the file. This header can be viewed by a text formatting utility, such as TYPE. Also, the name of a retrieved trace file can be displayed by clicking on the display title bar.

Export Files

Export files are similar to trace files in that they contain data from a trace display window, but they do not contain setup information and they are in ASCII format. As the files are ASCII, they can be easily read by other programs, or exported to other systems. As with trace files, these files contain header information that describes the data in the file. The SPS390 convention is to append **".txt"** to the name of data export files. An ASCII file in a Universal File Format (UFF) can also be selected with an appended **".uff"**.

Extended Recorder Files

Extended recorder files contain binary data of the contents of XRec memory. Also included with the data are the acquisition setup and analysis setup parameters that were in effect when the data was saved. These files can be fairly large, and should be carefully managed.

These files are used by the Save and Load XRec commands. The SPS390 convention is to append **".xrc"** to the name of these files.

Note that the Save command is *global*—all active channels are saved, whether or not they are displayed. Again, it is important to note that large files can be created that require careful management.

Averager Data Files

Averager data files can be used whenever cross properties averaging is performed. These files contain the active and reference channel power spectrums, as well as the real and imaginary parts of the cross spectrum between the active and reference channels. All standard Frequency Response Function (FRF) displays can be formed upon recall of this data. The SPS390 convention is to append "**.avg**" to the name of these files.

The **Save Averager** command is global; all active channels are saved, whether or not they are displayed, which can result in large files.

Waterfall Data Files

Waterfall data files contain binary data of the contents of waterfall memory. Also included with the data are the acquisition setup and analysis setup parameters that were in effect when the data was saved. These files can be fairly large, and should be carefully managed.

These files are used by the **Save** and **Load** waterfall commands. The SPS390 convention is to append **".wfl"** to the name of these files.

All of these files must be managed by DOS or Windows file management utilities. The SPS390 allows creation and use of these files, but you are responsible for deleting, archiving, or transferring these files.

All data files have an ASCII header that can be viewed via the DOS "type" command, or by a Windows utility such as Notepad.

3–9 DYNAMIC DATA EXCHANGE

Dynamic Data Exchange (DDE) allows data to be linked between two Windows programs running at the same time. With the DDE linkages incorporated into the SPS390 software, it is possible to transfer SPS390 data in real-time to a program, such as Excel™, which is running simultaneously. This allows the user to take advantage of powerful Excel display capabilities. For example, sometimes data being collected can be compared more easily in a bar graph or pie chart form. In such a case, real-time data can be transferred to Excel using the DDE feature, where it can be viewed as a chart. The values shown in the chart will update automatically in real-time.

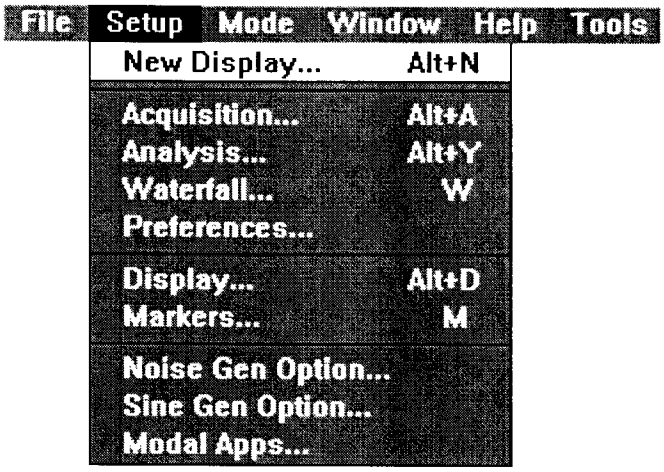
☞ *Additional topics on DDE can be found in Section 6*

3–10 MAIN MENUS

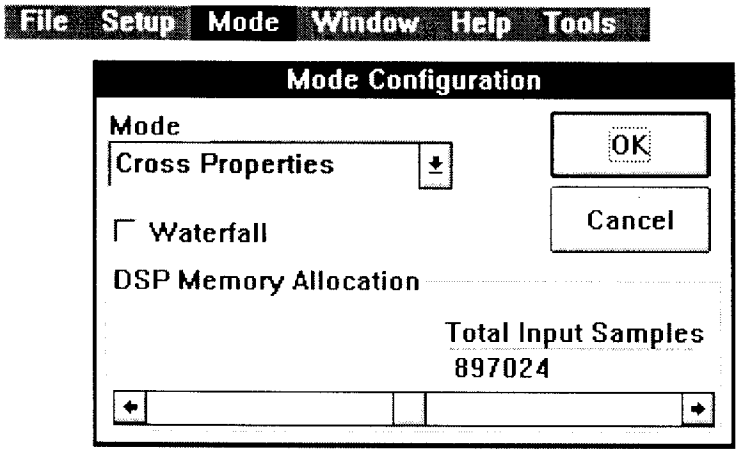
Six main menu items displayed on the top menu band allow accessing of all the features and functions of the SPS390.

- The **File** menu contains functions to save and restore system configurations, to save, restore, and export data, and to display data on hard copy devices.

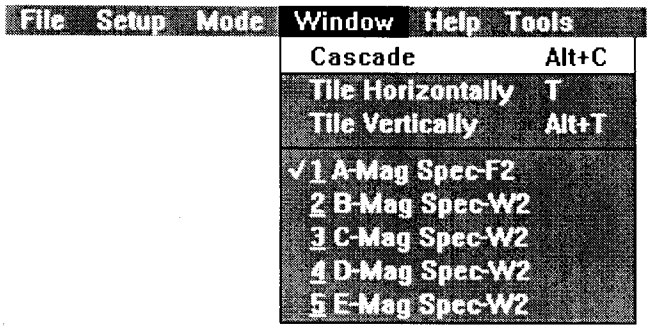
- The **Setup** menu accesses dialogs to create and modify acquisition, analysis, and display parameters.



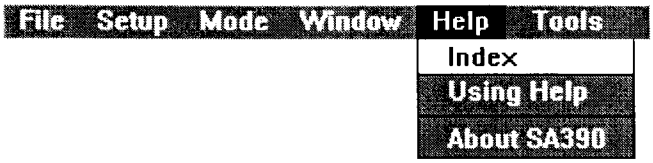
- The **Mode** menu sets the data collection and analysis mode of the analyzer.



- The **Window** menu allows arranging display windows in the SPS390 viewing area.



- The **Help** menu includes on-line documentation and configuration information.



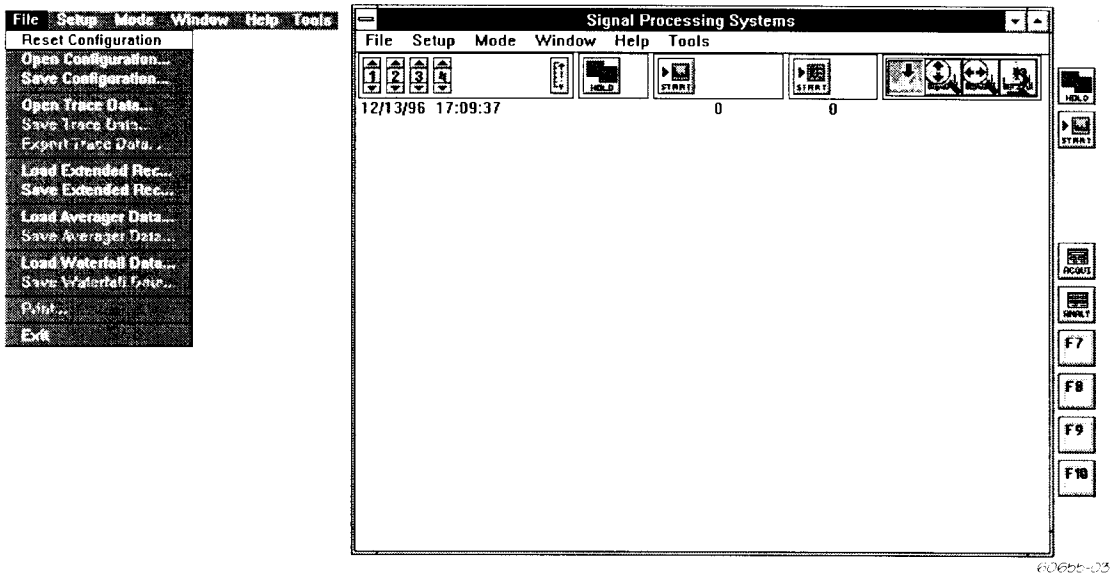
➢ The **Tools** menu allows the user to have quick access to up to four Windows™ programs or routines without leaving the SPS390 application.

3–10.1 File Menu

3–10.1.1 Reset Configuration

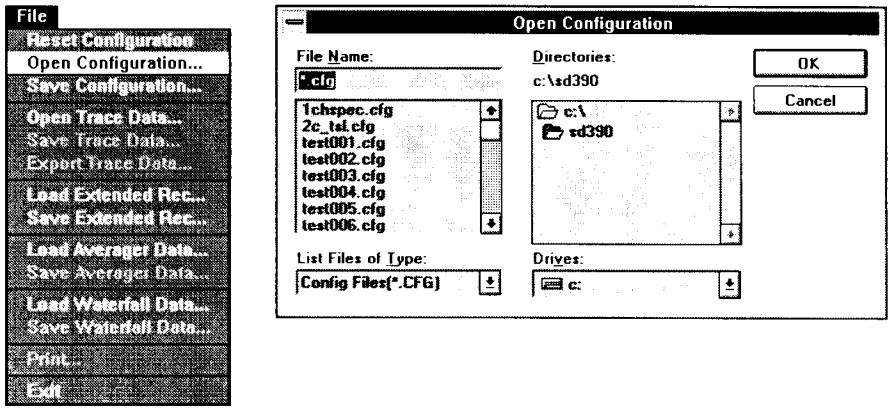
Reset configuration restores all menu settings in the SPS390 to the factory-defined default configuration and clears the display.

Typical Factory Default Configuration



3–10.1.2 Open Configuration

The **Open Configuration is used to select a particular configuration file from a selected directory and storage device. Open Configuration** restores the configuration of the SPS390 to a defined configuration that was created when the **Save Configuration** command was issued.



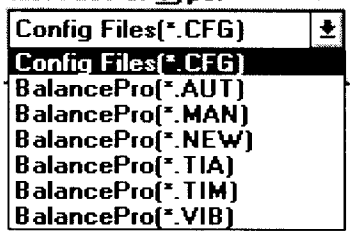
The **Open Configuration** includes:

- Settings for the Acquisition **Setup** Dialog.
- Settings for the **Analysis Setup** Dialog.
- Settings for the **Waterfall Setup** Dialog.

- Settings for the optional Signal Source Generator (SSG), if installed. If not installed this will prompt a notice that the SSG settings were attempted and failed. No adverse operational effects will take place other than there will be no SSG operation.
- All pre-configured display windows.

Under the **List Files of Type**: you may select from a number of configuration files available to the SPS390, SPS610 BalancePRO, and optional vibration survey software packages.

List Files of Type:



- **Config Files (*CFG)** are user defined SPS390 configuration files
- **BalancePRO (*.AUT)** files are files that support the automatic data acquisition for specific engine types.
- **BalancePRO (*.MAN)** files are files that support the manual data acquisition for specific engine types.
- **BalancePRO (*.NEW)** is a spare file type reserved for a future enhancement of the BalancePRO system.
- **BalancePRO (*.TIA)** files are files that support timed automatic data acquisition runs for vibration surveys without a tach signal.
- **BalancePRO (*.TIM)** files are files that support timed manual data acquisition runs for vibration surveys without a tach signal.
- **BalancePRO (*.VIB)** files are files that support automatic data acquisition for vibration surveys of specific engine types with a tach signal.

If no setup has previously been saved, this command has no effect.

☞ *The **Open Configuration** dialog is used to select a particular configuration file from a selected directory and storage device.*